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ABSTRACT

The Federal Open Market Committee (FOMC) simulation employed three techniques: case study, role playing, and model building, in order to acquaint college students studying money and banking with the creation of monetary policy. The specific goals of the FOMC simulation were: (1) to familiarize students with the data used in monetary policy formation, (2) to encourage students to theorize about functional relationships and to build models for their analysis of the data, (3) to enable students to envision the consequences of different policy actions in their models, and (4) to enable students to debate the relative costs and benefits of each policy action. The 66 students who participated in the course evaluations were generally favorable in their responses. They agreed that they learned a great deal, that it seemed like a "real life" situation, and that they actually practiced decision making. Their comments indicated that learning material in this way was practical and enjoyable. The statistical analysis of test results showed that the FOMC simulation does increase student understanding of basic economic facts and policy issues. (HV)

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An Evaluation of the Synergistic Simulation of the Federal Open Market Committee

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I. Introduction. Policy-makers are influenced by a variety of factors during their deliberations; the roles they play and the institutional constraints within which they operate are two obvious influences. Other influences include the facts of the situation, represented by a surfeit of economic measures and indices. Each piece of information is analyzed by policy-makers with the help of conceptual frameworks shaped by results churned out by mega-models or by considered opinions of experts. Simulations that purport to represent the decision-making process but fail to represent these varied influences run the risk of seriously misrepresenting events.

A method of minimizing the risk of oversimplifying processes or overemphasizing particular facets of these processes is to use a combination of simulation techniques or to synergize simulation techniques. The Federal Open Market Committee (FOMC)[1] simulation is an example. This particular approach is synergistic in that it uses the three techniques of case study, role-playing, and model-building. The general purpose of the FOMC model is to acquaint college level students studying money and banking with the creation of monetary policy. The specific goals of the FOMC simulation are: 1) to familiarize students with data used in policy-making and, in particular, the making of monetary policy; 2) to encourage students to theorize about functional relationships and to build models for their analysis of the data; 3) to enable students to envision the consequences of different policy actions in their models; and 4) to have students be able to debate the relative costs and benefits of each policy action. The following brief paragraphs explain the importance of the Committee in the making of actual U.S. monetary policy.

The Federal Reserve is the country's central bank. Its major objective "is to regulate the flow of money and credit in order to promote economic stability and growth."[2] In formulating and executing monetary policy the Federal Reserve tries to maintain a high level of employment, stable prices, a reasonable rate of growth and a favorable balance of trade. The Federal Reserve System consists of five groups: The Board of Governors, the Federal Open Market Committee, the Federal Advisory Council, the twelve Federal Reserve Banks, and member banks. Several comprehensive publications by the Federal Reserve explain its purposes and functions.[3]

The most important group in the Federal Reserve System, however, is the Federal Open Market Committee (FOMC). The group is responsible for monetary policy on a day-to-day basis because its main task is to conduct Open Market Operations. That is, it has the power to buy and sell government securities which directly and indirectly affects the supply of money and interest rates which in turn affects their goals. Because the directives issued by the FOMC are executed by the Trading Desk at the New York Federal Reserve, the President of the New York bank is always one of the twelve members of the Committee. The eleven others are the seven Governors and a rotating panel of Reserve bank Presidents from four of the other eleven districts.

The FOMC simulation is designed as an integral part of a semester's study of money and banking. As such, a FOMC simulation is held every other week for one class period. Students play the parts of members of the committee, Governors of the Federal Reserve Board, and staff economists. At each meeting various people are assigned the tasks of reviewing the current economic situation, of examining recent data for trends, and of offering policy recommendations. The meeting is conducted in a manner similar to the FOMC in Washington, D.C.

The effectiveness of most simulations is difficult to measure even with controlled pre- and post-testing. Given the open and progressive nature of the synergistic approach, any measure of effectiveness becomes more difficult. As a result, the effectiveness of the FOMC is examined in several ways. The students' evaluations of the simulation are reviewed and then a model is developed to determine what the students have learned as a result of the simulation. Third, an attempt is made to identify the level of understanding that is effected by the FOMC simulation.

II. Student Evaluation of the FOMC. Of the 66 students who responded to student course evaluations, 38 had participated in previous simulations. Forty-four of the 66 students were male. When asked to indicate the extent to which they agreed or disagreed with several statements, the responses were generally favorable to the simulation. For instance, students felt the objectives of the simulation were clear, that it was an effective means of meeting these objectives, and that they enjoyed the simulation. The students agreed they learned a great deal, that it seemed like a "real life" situation, and that they actually practiced decision-or policy-making. In most cases, the simulation helped students change their opinions on some issues. Open-ended comments stressed the practicability of learning material in this manner and that the simulation made studying fun.

III. An Ordinary Least Squares Evaluation of the FOMC Simulation. Given the enjoyable nature of the simulation, the question now becomes whether students' general understanding of economic principles was increased. In order to measure any change in student understanding of economic principles, a pre- and post-test were given to each member of the class. The tests were

identical. Forty multiple choice questions were chosen from Samuelson's Test Bank[4] for this purpose. Each question was selected to fit in one of four categories: 1) Fact; 2) Relationships; 3) Interrelationships and Predictions; and 4) Policy Issues. The four categories represent a condensed version of Bloom's[5] taxonomy of educational objectives. Bloom uses six major categories to describe the cognitive domain: Knowledge, Comprehension, Application, Analysis, Synthesis, and Evaluation, in ascending order of difficulty. Knowledge and Comprehension are the lowest levels of understanding and represent the ability to remember and grasp the meaning of the material. The two categories reflect a very rudimentary level of understanding and correspond to principles questions categorized under Fact. An example of such a question would be: How many members are on the FOMC? Bloom's Application is comparable to Relationships and includes such questions as the determinants of consumption. His Analysis and Synthesis categories are combined into the revised category of Interrelationships and Prediction. These questions concern functional shifts and resultant equilibria. Finally, the Evaluation category of Bloom's taxonomy directly corresponds to Policy Issues. Questions in this category are designed to reflect a higher level of understanding and measure a student's ability to argue the trade-offs sometimes necessary in achieving policy objectives.

The test was given at the beginning of the semester to the two sections of students and at the end of the semester was readministered as part of the final exam. The difference in the two sets of scores is intended to measure any change in each student's understanding of economic principles. In addition, since the test was divided into four categories, changes in each students's

understanding at various levels could be measured.

Any changes in a student's understanding of economic principles, whether measured by the overall change in pre- and post-test scores or by particular changes within categories of the test, are a function of several variables. The FOMC simulation is directed to each of the four categories; using this simulation should increase students' specific and general understanding of economics. The introduction and use of new material in the course should also increase their understanding of the subject matter at each level. The experiences, capacities, and energies of the professor should also have a positive impact on students' ability to deal with the issues. Also, the innate ability of each student and other particular characteristics should influence the overall outcome. Measures of each of these variables are difficult to obtain and the following statements are offered as proxies for each.

The impact of the FOMC simulation on students' understanding of economic principles is approximated using two measures. The first measure is the student's grade for the semester on his performance at FOMC meetings, obtained by totaling the best 5 out of 6 scores for each session. At each session a student or group of students could earn up to 20 points, dependent upon the quality of their briefing of the FOMC members. The briefing consisted of three parts: a review of current economic situation, an analysis of the trends, and suggestions for policy. Each section of the briefing had to be adequately covered for full credit. It would seem that the better a student performed in the FOMC simulations, the more he would learn overall and in specific areas.

The second measure of the FOMC's impact is the change in a student's score on a position paper. Students were required to write position papers which paralleled the oral briefings of the FOMC; that is, the position paper had three parts. The first section reviewed the current economic situation, the second part attempted to analyze the current economic situation within a macroeconomic model, and the third section was a discussion of policy alternatives in view of the previous information and analysis. Students could earn up to 10 points on each section if appropriate material was discussed. At the beginning of the course, students were given the option of writing a shortened practice version of the paper; most students exercised that option in order to receive early feedback. The difference between the practice paper and the final position paper measured the influence of the FOMC simulation, as approximated by this written indication of the student's understanding of economic principles.

The influence of the course is measured using the students own rating of the course. At the end of the semester, students were asked to rate the course on a scale of one to seven, with a one indicating that the course was among the worst classes the student had attended, and with a seven indicating the course ranked among the best. A similar rating was used as a proxy for the effectiveness of the professor. A higher rating in each should indicate the students felt they benefited from the classroom experience.

Finally, the individual characteristics of each student play an important part in determining what and how much they learn over the semester. Seniors probably have a greater knowledge base and better understanding of economic principles than do juniors and sophomores; therefore, they should learn more. Students with higher grade points should learn more if grade point accurately measures aptitude. Since much of economic theory is abstract conceptualizing,

students with mathematics backgrounds -- indicated by the number of courses taken -- should do better than students with fewer courses. Sex may play a significant role. Women who enter this predominantly male field of study tend to be exceptional students; if so it seems that female students would learn more and perform better than the average male economics student. Similarly, since some students tend to think of money and banking as being business-oriented in a liberal arts institution lacking a business department, those students may do worse than other students who consider the course as economics. Finally, students willing to attend a morning class as opposed to an afternoon class may be more highly motivated than other students and would learn more. The influence of these last three characteristics is captured using dummy variables.

The relationship between the dependent variable, the change in a student's understanding of economic principles or various levels of that understanding, and the numerous independent variables is defined by the following equation:

(1) $Y_i = a + b_1 X_1 + b_2 X_2 + - - - + b_n X_n + u_i$ for i = 1 to n

where Y_i is the dependent variable and X_i are the independent variables. This is a linear multiple regression model where all the basic assumptions regarding the error term, u_i are assumed to be true. The multiple regression coefficients (b_1, b_2, ---, b_n) indicate the changes that occur in the dependent variable as a result of a one-unit change in the independent variable, ceteris paribus. Each of the X_i's are described below:

X_1 - CHGSIMT = change in total position paper score

X_2 - CHGSIM1 = change in position paper score, Section I.

X_3 - CHGSIM2 = change in position paper score, Section II.

X_4 - CHGSIM3 = change in position paper score, Section III.

X_5 - PROFESSOR = student rating of professor.

X_6 = COURSE = student rating of course

X_7 = ORALSIM = student total classroom FOMC score

X_8 = AGE = the student's age

X_9 = SEX = the student's sex; 0 = female and 1 = male

X_{10} = YEAR the student's class; 1 - freshman, 2 - sophomore
3 - junior, and 4 - senior

X_{11} = GPA = the student's overall gradepoint

X_{12} = INTENT = the student's career orientation; 0 - non-business
1 - business

X_{13} = MATH = the number of previously completed math courses

X_{14} = SECTION = the student's section; 0 = morning section
1 = afternoon section

i = the i^{th} student, i = 1, - - -, 58

The impact of each of these variables on the dependent variable, Y = CHGSAMT, the change in the student's understanding of economic principles, was found by calculating the regression coefficients for each variable and the relevant t-statistics from 58 observations.

The results of this regression are summarized in column 1 of Table I. The variables chosen as possible influences on the change of student understanding are insignificant at the 5% level. These disappointing results are alleviated when the total change in student principle scores are broken down into the ascending categories. Allow CHGSAM1 to equal the change in student scores on the Fact section of the exam, CHGSAM2 to equal the change in scores on the Relationship section, CHGSAM3 to equal the change in scores on the Interrelationships section; and finally, CHGSAM4 to equal the change in scores on the Policy Issues section and rerun the regression. The results presented in the remaining columns of Table I are somewhat encouraging.

TABLE I

COEFFICIENTS AND t-RATIOS

Dependent / Independent	(1) CHGSAMT	(2) CHGSAM1	(3) CHGSAM2	(4) CHGSAM3	(5) CHGSAM4
CONSTANT	3.33 (0.18)	6.57 (0.75)	9.51 (1.06)	-6.40 (0.68)	-8.73 (0.96)
CHGSIM 0, 1, 2, or 3	-0.02 (0.13)	0.14** (1.27)	0.07 (0.76)	-0.12 (1.22)	-0.20** (1.59)
PROFESSOR	0.47 (0.71)	0.11 (0.35)	0.19 (0.58)	-0.50** (1.44)	0.51** (1.47)
COURSE	-0.06 (0.09)	0.08 (0.23)	-0.33 (0.95)	0.89* (2.49)	-0.61* (1.76)
ORALSIM	0.06 (0.32)	-0.09 (0.98)	-0.04 (0.39)	0.07 (0.67)	0.14** (1.42)
SEX	0.20 (0.15)	0.41 (0.65)	0.62 (0.95)	-0.23 (0.34)	0.56 (0.87)
YEAR	0.50 (0.40)	0.06 (0.11)	-0.23 (0.38)	-0.47 (0.74)	0.44 (0.71)
GPA	-1.21 (0.73)	0.55 (0.68)	-0.67 (0.81)	0.14 (0.17)	-0.97 (1.18)
INTENT	-1.00 (0.89	0.47 (0.87)	-0.82** (1.46)	-0.84** (1.45)	0.11 (0.20)
MATH	-0.20 (0.76)	-0.19** (1.49)	-0.12 (0.92)	0.07 (0.50)	0.03 (0.25)
SECTION	0.31 (0.27)	-0.62 (1.12)	0.38 (0.62)	0.39 (0.60	-0.08 (0.14)
R^2	.07	.13	.11	.20	.19

* = significant at 5% level, ** = significant at 10% level, D.F. = 47

The results indicate that increases in a student's score on the Fact section of the position paper caused increases in a student's factual understanding of economic principles. The conclusion is true at the 10% level of significance. The more math background a student has, the smaller the changes in the factual section. Thus this equation explained only 13% of the variance in principles scores for the section of the test. The other variables were not significantly different from zero.

In the third regression, a student's plan to go on to graduate school in business or go directly into business had a negative effect. This means that students who viewed the course from a practical perspective tended to change their level of understanding economic relationships less than other students. This variable was the only variable significant at the 10% level and this equation explained 11% of the total variance.

Equation 4 in Table I presents some interesting results, indicating that the higher a student rated the course, the greater the change in scores on the interrelationship section of the basic test. This variable is significant at the 5% level. At the 10% level of significance, both the professor's rating and the student's intent had a negative impact on the student's change in scores for the section. The higher the student rated the professor, the smaller the change in score; the lower the student rated the professor, the greater the change in their score. Similarly, the more inclined a student was toward business, the smaller the change in interrelationship scores.

Finally, Equation 5 shows that the better a student performed on the policy section of the position paper, the smaller the change in his understanding of policy issues. In contrast, the better a student performed in class, the greater the change in his policy scores. These seemingly inconsistent results may indicate that students' writing skills lag behind their ability to state orally their position. Also significant at the 10% level is the rating students gave the professor. The higher the students rated the professor, the greater the change in their policy scores. At the 5% level of significance, however, the higher the students rated the course, the smaller their change in policy scores. The equation explains only 19% of the variance.

The low R^2 statistics are not particularly troublesome, since this model is not intended to predict outcomes. It is, however, intended to test which variables of the model explain some of what is observed. The t-Ratios are more important in this case; given the results, several observations are in order. First, the conclusions are tentative because the sample size is so small. A larger sample may give better results. Second, the data were not completely symmetrical; that is, the basic test had four levels of understanding, while the position paper had only three sections. The second section of analysis, in actuality, paralleled sections 2 and 3 of the principle test. A reworking of the position paper into four sections directly corresponding to that of the principles test would be desirable but very difficult to achieve.

In addition, the professor's rating, because of the strong positive impact on the policy changes, may reflect the role that the professor assumed in the FOMC, indicating that the simulation had a much greater impact than the data shows. On the whole, however, the FOMC simulation does increase a student's

understanding of basic facts. More importantly, the FOMC simulation seems to have a strong impact on a student's understanding of Policy Issues as reflected in Equation 4, more so than the course alone would indicate.

In addition to showing that the FOMC simulation seems to be designed effectively, the results also indicate that other variables not yet discussed are important in changing the intermediate levels of knowledge. It is important to analyze these various levels of knowledge separately as suggested by Bloom. The results of Equation 1 would have been disappointing if it were not for the other four equations cancelling out many of the primary efforts.

Footnotes

[1] For a more detailed rationale for this approach and description of the simulation see Bartlett, R. L. and Amsler, C. E., "A Synergistic Approach to Simulation in Economics." Unpublished manuscript available from the Denison Simulation Center, Denison University.

[2] The Federal Reserve at Work (Richmond: Federal Reserve Bank of Richmond, 1969), p. 5.

[3] Ibid., and also see The Federal Reserve System: Purposes and Functions (Washington: Board of Governors, 1974).

[4] Questions were taken from the macroeconomic sections of Samuelson, P. A. and Crandall, M. S., Test Bank for Use with Samuelson: Economics, 10th Edition (New York: McGraw-Hill Company, 1976).

[5] Bloom, B. S., Hastings, J. T., and Madaus, G. F., Handbook on Formative and Formative and Summative Evaluation of Student Learning (New York: McGraw-Hill, 1971).

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